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ABSTRACT

The report analyzes data on the number of women pilots and the number of women faculty in colleges and universities that offer a baccalaureate degree in aviation. Data were obtained from "U.S. Civil Airmen Statistics," "The Chronicle of Higher Education Almanac," and a survey of the 69 collegiate institutions that have aviation programs. The data verify that women are not proportionally represented in aviation career fields that require Federal Aviation Administration certification or in the aviation faculty ranks. Only six percent of all aviators are women, slightly decreased from 1978 to 1988. While the number of women who have become Airline Transport Pilots has increased from 1978 to 1988, the number of women student pilots has decreased. Women hold 5.2% of full-time aviation faculty positions. Women hold 6.5% of the earned doctorates in the technologically related field of engineering. Five percent of Certified Flight Instructors are women. Several recommendations are offered to increase the representation of women in the collegiate aviation faculty. Includes eight references. (JDD)

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ABSTRACT

This study analyzes data on Federal Aviation Administration certificate holders and compares it to data obtained on aviation faculty in higher education to establish whether or not women are under represented in the collegiate aviation faculty.

ABOUT THE AUTHOR

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INTRODUCTION

American society has made some progress in accepting women in the work place. Successes are visible in many careers. Achievement is evident in all. However, encouragement for women to participate in aviation has not paralleled these successes.

The history of women in aviation exemplifies significant contributions too numerous to detail within the scope of this study. However, the time has come to consider the accomplishments that could have been achieved if women had been fully enfranchised into the field of aviation. This problem is especially evident among the ranks of pilots and those who educate pilots.

American Demographics (Nov. 1989) describes this phenomena as a "demographic wild card" which can be utilized to put more pilots in the sky. The successes which women have had in other fields has allowed them the economic ability to viably pursue a flight career. It is further speculated that the Federal Aviation Administration (FAA) may even offer a special encouragement to women by ceasing to call pilots "airmen." (Newitt, 1989)

The opportunity to become a professional aviator has never been more accessible than now. The General Aviation Task Force reports that flight instruction increased 12.5 percent in 1989. Student pilot starts in September 1989 were 10,153 compared to 7,624 the preceding year (More Student Pilots, 1990). The influx may be attributed to the widespread news that more than one-half of all airline captains will reach mandatory retirement age before the year 2000. Combine this with the fact that military pilot

attrition rates have slowed to record lows and thus the career potential becomes obvious.

WHY ARE WOMEN UNDER REPRESENTED IN AVIATION

Under representation in aviation by women is generally agreed to be synonymous with that of other careers which have been nontraditional for women. The FAA is circulating a monograph titled Women in Aviation and Space written by Dr. Sandra Flowers of the Alabama Aviation and Technical College which addresses this question. Possible reasons for under representation, as suggested by Dr. Flowers, are as follows:

1. Cultural and psychological barriers to nontraditional work are imposed on women, not only by society, but by women themselves.
2. Women have not received the necessary information and training they need to prepare for nontraditional careers.
3. Nontraditional role models are few in number and are not readily available to girls and women.
4. The lack of support from family and peers negatively affects nontraditional career options for women.
5. Sex-role stereotyping in all types of media precludes an environment which supports nontraditional career choices and role models.

This clearly establishes the basis for concern. Defining the problem of under representation is certainly as complex as determining the solution. Neither can be appropriately addressed in the brevity of this forum. However, the analysis of the data to be presented may foster a greater understanding which may lead to a solution to some aspect of this problem.

DESCRIPTION OF STUDY

The material presented here is of a narrow focus to the overall problem of under representation of women in aviation. Although, this endeavor will be successful if it allows any improvement in the awareness of this problem and, consequently, addresses even one aspect of its solution.

Previously addressed were reasons why women have not achieved proportional representation in aviation. One reason cited was that young women do not have an adequate number of role models. This is especially true for those women who choose to become pilots or aviation educators.

The primary objective of this report is to analyze the potential similarity between the number of women pilots and the number of women faculty in colleges and universities which offer a baccalaureate degree in aviation. Secondarily, data obtained on the number of women faculty in aviation will be analyzed against data on the number of women receiving earned doctorates.

RESEARCH METHODOLOGY

Secondary data was obtained from two sources. Data on the number of women who are pilots was obtained from the FAA which publishes an annual summary of pilot demographics titled U.S. Civil Airmen Statistics. The data on women receiving doctoral degrees is periodically collected by the U.S. Department of Eduction. This

information is reported annually in The Chronicle of Higher Education Almanac. These sources can be regularly reviewed to monitor the progress toward achieving proportional representation for women in both of these areas.

Primary data on women faculty in collegiate aviation programs was obtained through a survey of baccalaureate degree granting institutions listed in the Collegiate Aviation Directory 1989. Each of the sixty-nine institutions which cited baccalaureate degree programs were contacted and asked to report the number of full-time faculty which teach aviation courses distinguishing the total number of males and the total number of females. All 69 institutions responded for a response rate of 100 percent.

DATA PRESENTATION

Analysis of the change in the percentage of pilots who are women from 1978 to 1988 may offer a brief historical perspective. Table 1 will compare the ratios of female to male FAA pilot certificate holders from 1978 to 1988. This information is published by the FAA on June 30th of the following year. Consequently, 1988 information is the most recent data which may be evaluated.

Table 1

Total FAA Certificated Pilots

1978			1988		
	Certificates Held	Percentage		Certificates Held	Percentage
Female	49,874	6.25%	Female	42,297	6.09%
Male	748,959	93.75%	Male	651,717	93.91%
Total	798,833	100.00%	Total	694,016	100.00%

Source: U.S. Civil Airmen Statistics

While the last ten years have seen advances in opportunities available to women, progress has not been evidenced in piloting careers. Table 2 provides a detailed distribution of each FAA certificate category by gender. Both non-flight and flight categories are presented. A comparison between the current data and that from ten years previous is rendered.

Table 2

Female FAA Certificate Holders

Category	1978	1988
Student	26,354	17,529
Private	19,147	17,544
Commercial	3,306	4,410
ATP	270	1,745
FE	82	822
CFI	1,458	3,018
A&P	597	2,565

Source: U.S. Civil Airmen Statistics

Although percentages of certificated women pilots are widely disproportionate, higher education is one area where women are experiencing gains toward achieving a proportionate role. One U.S. Department of Education report states that "women will be earning more doctoral degrees than men by the year 2000." (Projections,1989). Table 3 shows the current gender distribution of women in the higher education faculty. A comparison is offered between private and public institutions.

Table 3

Faculty Distribution by Gender

	Female %	Male %	
Public	28.1	71.9	(100%)
Private	27.9	72.1	(100%)
Median	28.0	72.0	(100%)

Source: The Chronicle of Higher Education Almanac 1989

Most fields within higher education are experiencing gains in the number of women who are receiving doctoral degrees. Within the discipline of education, this figure has surpassed 50 percent. Since there are no doctoral degrees solely devoted to aviation aside from aerospace engineering, Table 4 illustrates the number of women receiving doctoral degrees in fields related to aviation.

Table 4

Percentage of Women Receiving Doctorates in Aviation Related Fields

Business	23.4
Education	55.1
Engineering	6.5
Median All Fields	35.2

Source: The Chronicle of Higher Education Almanac 1989

The final data to be presented are the results from a survey of the 69 baccalaureate-level aviation education programs which was previously described. The information obtained through the survey offers two new sets of descriptive data about the status of these programs. First, it provides a measurement of the overall size of the faculty in baccalaureate-level aviation institutions. Secondly, the data provides the gender distribution of that group of faculty. The information provided in Table 5 describes the gender distribution of aviation faculty.

Table 5

Gender Distribution of Aviation Faculty

Gender	Number	Percentage
Female	25	(5.2%)
Male	456	(94.8%)
Total	481	(100.0%)

March 1990

DATA ANALYSIS

The data obtained through this study offered verification of the previously developed assumption that women are not proportionally represented in the aviation career fields which require FAA certification or in the aviation faculty ranks. Influences which contributed to the figures reported herein are numerous and exhaustive. Thus, the information that was obtained is discussed in light of the relationship to recommendations for action rather than the factors from which they were derived.

The fact that only six percent of all aviators are women (Table 1) necessitates a cause for immediate action. Even greater concern arises from the fact that this percentage decreased slightly during the previous ten years from 6.25 percent in 1978 to 6.09 percent in 1988. This greater concern is that perhaps an appreciable change in the forthcoming ten years will not be evidenced without a coordinated action plan.

A review of the information obtained in Table 2 offers a view of limited success in the professional categories. The limitation is that as the proportion of women who have become Airline Transport Pilots (ATP) has increased from 270 in 1978 to 1,745 in 1988, the number of women student pilots has decreased from 26,354 to 17,544. These figures indicate that the years of 1978 to 1988 have seen a period of attrition within the ranks along with a significant decrease in new entrants. This trend could further indicate a decrease in the total number of women pilots in forthcoming years.

Albeit regression is evident in several areas, advances and achievements which have occurred are also noted. The progress exhibited in the notable increases made at the professional pilot level of ATP and Commercial demonstrates new inroads being achieved by women in aviation. Table 2 further illustrates other accomplishments made during the last ten years. Also, showing additional entry into the professional flying area is the increase in female Flight Engineers from 82 in 1978 to 822 at the end of 1988. The Flight Engineer position is the standard entry-level job with major airlines. This should indicate a trend toward an increasing number of ATPs as these individuals progress forward in the cockpit as first officers and captains.

Another area which presents a level of achievement is the non-flying role of aircraft mechanic (A&P). The A&P job field is similar to that of automotive mechanics in the visible percentage of women who practice that trade. The increase in the number of A&Ps from 597 in 1978 to 2,565 in 1988 highly suggests an increased interest and opportunity for women in this field. These expansionary figures show commendable commitment as the training requirement to become an A&P presents a high opportunity cost. The minimum time requirement to obtain this rating is 18 months of intensive full-time study at a technical school with little or no time available for part-time employment while pursuing certification. This opportunity cost, however, is still significantly lower than that of becoming a professional aviator.

The demographic data viewed in Table 3 shows that 28 percent of all higher education faculty are women. Currently the median

figure of women receiving doctoral degrees is 35.2 percent (Table 4). Since the doctoral degree represents the primary credential for higher education faculty, the increasing number of women receiving this degree throughout the remainder of this decade suggests that women will obtain a more proportionate role in the higher education faculty. This figure should provide further encouragement to women to pursue the attainment of faculty positions in higher education as well as to continue the pursuit of the doctoral degree.

The data obtained through a survey of collegiate aviation education programs and represented in Table 5 gives evidence of the perceived low representation of women in the collegiate aviation faculty. Only 5.2 percent of full-time aviation educators in the programs surveyed were women. This fact should act as a call to action for those who are concerned with this issue. When this piece of data is compared with the other information contained herein, a correlation may be discovered between this phenomena and others which were previously reported.

CONCLUSIONS

Having discovered that only 5.2 percent of the collegiate aviation faculty consists of women, the question of why must now be considered. After reviewing Table 3 which shows faculty distribution by gender, we can see that the percentage of overall faculty which are women (28%) is not relational to the percentage of aviation faculty which are women (5.2%). This fact demonstrates

that the aviation faculty is not representative of the national norm with respect to the percentage of faculty which are female.

Table 4, which exhibits data on the percentage of women receiving doctorates in aviation related fields, does not have a median (35.2%) which corresponds with the percentage of aviation faculty that are women (5.2%). However, the field of engineering has a percentage of 6.5 percent of earned doctorate recipients being female is close to the percentage of female aviation faculty (5.2%). Since aviation is perceived to be a high technology field, it could be possible that these two figures have a relational tie.

Another comparison of research data is that between the percentage of women aviation faculty and the percentage of women who are pilots. Table 1 presents the fact that 6.09 percent of FAA certificated pilots in 1988 were women. When you compare this with the fact that 5.2 percent of aviation faculty are women (Table 5) an obvious relationship can be seen. The percentage of women faculty and women pilots is very similar. This bit of data may suggest that women faculty in higher education is representative of the demonstrated interest that women have in aviation. If so, it could be stated that the problem is not that women are under represented in the aviation faculty ranks, but the problem is that women are under represented in aviation as a whole.

Another figure which offers significant correlation to the percentage of women faculty and overall women pilots is the percentage of women who are Certified Flight Instructors. In 1988 the U.S. Civil Airmen Statistics reported that 5 percent of FAA Certified Flight Instructors were women. Being close to the 5.2

percent of women aviation faculty figure may indicate a correlation. The basis for this relationship could be reasoned through the fact that the Certified Flight Instructor rating is held by those who become pilot educators. Furthermore, the Flight Instructor certificate acts as the terminal rating for most aviation educators.

SUMMARY

The purpose of this study was to analyze data on FAA certificate holders and compare it with demographic data obtained on aviation faculty to establish whether or not women are under represented in the collegiate aviation faculty. Women comprise 6.09 percent of all FAA certificated pilots. Women hold 5.2 percent of the full-time aviation faculty positions. Women hold 6.5 percent of the earned doctorates in the technologically related field of engineering. Finally, 5 percent of Certified Flight Instructors are women.

These figures indicate a consistently common level of participation by women in the field of aviation. In the area of the aviation faculty, it could be established that the participation of women is representative of the participation of women in aviation overall and that there should be no call for alarm. However, this would be a grave error. It would be appropriate to state that the number of women aviation faculty members are relative to these figures. It would even be more

appropriate to state that women are under represented in all aspects of aviation in relation to their proportion in society.

Therefore, our concern for the under representation of women in the aviation faculty of higher education is overshadowed by concern for the under representation of women in all of aviation. If the data presented within this study provides a basis that the percentage of women in the aviation faculty is relative to the number of women FAA certificate holders, then the resulting call to action must be to increase the number of overall women FAA certificate holders.

RECOMMENDATIONS: A CALL TO ACTION

The recommendations offered are not comprehensive toward the solution of the problem considered herein. However, they should offer insight toward the solution of the problem of under representation by women in the collegiate aviation faculty. Further recommendations shall be requested from participants in the conference session held on the topic of this work.

1. Recruit women aviation faculty to foster role models.
2. Increase the number of female students in aviation programs.
3. Work towards a means to facilitate more women to become pilots.
4. Solicit assistance from women's aviation organizations.
5. Encourage industry to hire more women in aviation.
6. Decrease stereotypical barriers to aviation which face women.
7. Synthesize the aviation public to the problem.
8. Develop more coordinated graduate programs in aviation.

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